For the rest of the static load tests, load was applied slowly rather than at a specific rate in order to ease the collection of load-deflection data. After each desired load level was reached, either the load was held for crack marking or unloading followed immediately. Load-deflection data were collected at every 8.9 kN (2 kips) load increment.

Due to the need to repair the hydraulic system for the actuator, Static A-1, A-2, A-3, and A-4 tests were performed 43 days after the initial static load tests. Static A-1, 2, 3, and 4 were four repetitive tests. On the 4th test (Static A-4), the desired load of 623 kN (140 kips) was held for crack marking and measurement. In total, eight static load tests were performed before the beginning of fatigue testing.

3.4.2 Fatigue Test

The girder was tested under fatigue loading without a composite deck. The fatigue load was applied at midspan as a point load at one cycle per second. This loading frequency made efficient use of the hydraulic system and avoided resonance with the natural frequency of the test specimen. The magnitude of the cyclic load varied from 116 kN (26 kips) to 476 kN (107 kips). The lower limit load produced the same moment at midspan as a composite deck of 2.44 m (8 ft.) wide and 203 mm (8 in.) thick. The upper limit load would produce a nominal bottom fiber stress of 1.81 MPa (263 psi) at the midspan of the composite girder (i.e., the test girder with a hypothetical deck), which is equal to the design stress of $0.25\sqrt{f_c'}$ MPa ($3\sqrt{f_c'}$ psi) used by NCDOT. The corresponding concrete stress at the bottom layer of prestressing strands would be 1.72 MPa (249 psi) as shown in Figure 3.4. (The corresponding nominal bottom fiber stress in the test girder would be 1.90 Mpa (276.2 psi) or $0.26\sqrt{f_c'}$ MPa ($3.15\sqrt{f_c'}$ psi.)